
वस्त्रादि — पुरुषों के लिए
बुनी हुई पुलोवर — विशिष्टि
(दूसरा पुनरीक्षण)

**Textiles — Gent's Pullover,
Knitted — Specification**
(*Second Revision*)

ICS 59.080.30; 61.020

© BIS 2022



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Hosiery Sectional Committee had been approved by the Textiles Division Council.

This standard was originally published in 1966 and subsequently revised in 1992. The present revision has been made in the light of experience gained since its last revision and to incorporate the following major changes:

- a) Requirement for fineness of wool for woollen pullover has been specified.
- b) Requirement and test method for fibre composition have been updated.
- c) References to Indian standards have been updated.
- d) BIS Certification and Marking clauses have been modified.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

TEXTILES — GENT'S PULLOVER, KNITTED — SPECIFICATION

(*Second Revision*)

1 SCOPE

1.1 This standard prescribes the constructional particulars and other requirement of gent's knitted pullover manufactured by machine knitting, using hosiery yarn, which are bleached, dyed or in mixture shades.

1.2 The standard does not prescribes the subjective characteristics like design, colour combination, type of finish, general appearance and feel of pullover.

2 REFERENCES

The standards given in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards.

3 TERMINOLOGY

For the purpose of this standard, the definition given in IS 3596 and SP 45 shall apply.

4 MANUFACTURE

4.1 Class of Pullover

The pullover shall be of any one of the three classes, depending upon the quality of the fibrous material used in its yarn (out of which the pullover is manufactured). The following are the class of pullover:

- a) Woollen pullover;
- b) Acrylic pullover; and
- c) Blended pullover.

4.1.1 The woollen pullover shall be further designated in three categories as indicated below depending upon the quality grades of virgin wool tops (*see* Note 2 under **4.2.1**) out of which this is manufactured:

- a) Superfine Above 70^s
- b) Fine Above 60^s and up to 70^s
- c) Medium Above 56^s and up to 60^s

4.1.2 The acrylic pullover shall be manufactured from 100 percent acrylic yarn spun from acrylic tops on worsted system. The acrylic tops shall not contain acrylic fibres obtained from waste or re-manufactured acrylic material.

4.1.3 The blended pullover shall be manufactured from yarn spun from the blends of wool with acrylic fibres and/or polyester fibres (or) viscose rayon and/or polyamide (nylon) fibres as given in **4.2.1**.

4.2 Yarn

The hosiery spun yarn used for knitting the pullover and its components like welt (or tape), cuff and border shall be evenly spun from quality fibre tops in soft twist and shall possess good covering properties, spun on the worsted system (*see also* **4.3.1** and **4.3.2**).

4.2.1 The hosiery yarn, shall be 100 percent virgin wool (*see* Note 2), or 100 percent acrylic fibres, or blends of wool with acrylic fibres and/or polyester fibres (or) viscose rayon and polyamide (nylon) fibres (*see also* IS 7026 and IS 7747). In the blends, the virgin wool content shall not be less than 70 percent and that of viscose rayon, wherever viscose rayon is used, shall not be more than 15 percent. The wool tops of quality not lower than 56s top shall be used for the manufacture of hosiery yarn. The blend proportions shall be such that it shall not exceed more than three fibre components (*see* Notes).

NOTES

1 Additionally, animal hair fibres 100 percent or along with virgin wool blends as per **4.2.1** may also be used if agreed to between the buyer and the seller. The fibres present in the yarn may be identified as per the method given in IS 667 (to be read along with supplement).

2 For information. identification of virgin wool may be made by microscopical examination of the scales on the wool fibre which are comparatively less damaged as compared with shoddy wool or waste etc. Also, it may be noted that the hairiness, and thereby pilling, in the fabrics are more pronounced when other wools are used.

4.3 Fabric

The fabric used in the manufacture of pullover shall be evenly knitted by machine knitting. The hosiery yarn used (or the fabric) shall be bleached or dyed to the

required shade or knitted with yarn of mixture shades as agreed to between the buyer and the seller.

4.3.1 *Moth Proofing*

The yarn or fabric used in the manufacture of pullover and their components before seaming may be treated with suitable moth proofing agents, if agreed to between the buyer and seller.

4.3.2 *Shrink-proof*

The tops of yarn or fabric used in the manufacture of pullover may also be treated with a suitable shrink-resistance process, if agreed to between the buyer and the seller.

4.4 Seams and Stitches

All joining shall be stitched with three-thread overlock stitches or by linking or by covering stitches (*see also* IS 10789 and IS 11161).

4.4.1 It is recommended that for all stitches made from one strand of sewing thread conforming to any one of the appropriate varieties specified in IS 1720 or IS 9543 or sewing threads of best quality, shall be used in this needle and two strands of sewing threads as above or of the same type as used for knitting the pullover, shall be used in the loops.

4.4.2 In case of single colour pullover all threads used for stitching shall be of the same colour as that of the body of the pullover; and in case of multi-colour pullover they shall be of the major or ground colour.

4.4.3 The number of stitches shall not be less than 4 per cm.

4.5 Pullover

The shape of the pullover shall be as shown in Fig. 1. The wales shall preferably run along the length of pullover.

NOTE — The pullover may also be tailored with pocket (s) at equidistant of the shape and size as agreed to between the buyer and the seller.

4.5.1 If agreed to between the buyer and seller, the pullover shall be made of one piece with cuffs at sleeves and border at the bottom. The welt at the neck shall be attached to the pullover by stitching or linking. Alternatively, this may be manufactured by joining at the shoulder through the sides.

4.5.2 The pullover shall be of V-neck, round-neck or high-neck (*see* Fig. 1, 1A and 1B as agreed to between the buyer and the seller).

4.5.3 *Welt (or Tape)*

As agreed to between the buyer and the seller, the welt meant for stitching or linking at the neck shall be rib knitted such as 1×1 , 2×2 etc, or trimmed out of the fabric as used for fabricating the pullover.

4.5.3.1 The width of the welt is case of pullover having V-neck and round-neck shall be at least 20 mm and in case of pullover having high neck it shall be as agreed to between the buyer and the seller.

4.5.3.2 The welt at the neck shall be securely stitched or linked to the pullover. The seams shall appear on the inside of the pullover.

4.5.4 *Border*

The border at the bottom of pullover and at the cuffs at sleeves may be preferably knitted along-with the pullover or sleeves in 1×1 rib or 2×2 rib knitted fabric, so as to have more elasticity than the body of knitted pullover and sleeves. If the border is knitted separately it may be stitched or linked in such a way that the seams appear at the inside of the pullover. The projecting ends of the seams, if any, may be flattened by over seaming or seam covering stitches.

4.5.5 *High Neck Portion*

In case of high neck pullover, it may be preferably knitted in 1×1 or 2×2 rib knit along with the body of the pullover. If the high neck portion is knitted separately, it may be knitted with more elasticity and may be stitched or linked in such a way that the seams may be flattened by seam-covering, over-covering or flat-block seam stitches. The height of the high neck pullover shall be at least 40 mm or as agreed to between the buyer and seller.

4.5.5.1 *Reinforcements*

The seam joining the body and the border, cuffs or sleeves or at the shoulder and other places shall be reinforced suitably at the inside, preferably by seam covering.

4.5.5.2 The 'round' or tabular edges of the rib welts intended for reinforcement shall be formed by knitting three or four courses.

4.5.6 All stitches shall be of even tension throughout with all the loose ends securely fastened. Stitching shall not give way when the pullover is stretched to one and a half times.

4.5.7 *Freedom from Defects*

The pullover shall be free from grease, soap, filling or any other extraneous material. It shall be reasonably free from manufacturing and tailoring defects such as large mends, ladders, dropped stitches improper reinforcement, missed stitches. It shall be also free from stains, chemical damages and dyeing defects like uneven dyeing, streakiness, etc. The fabric used shall not be over boarded.

5 REQUIREMENTS

5.1 The dimensions of the pullover shall conform to the requirements specified in Table 1 when read with Fig. 1.

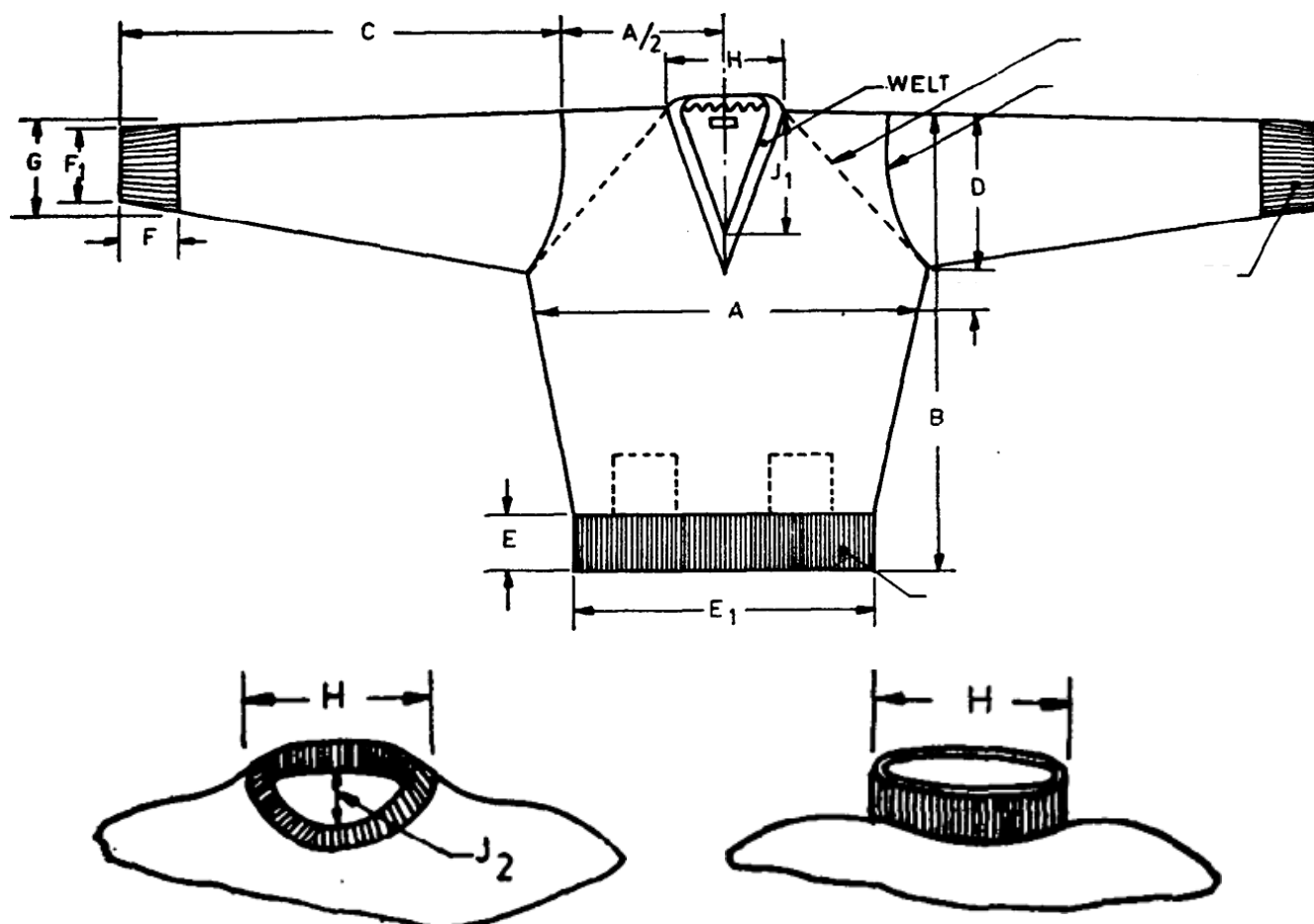


FIG. 1 A ROUND NECK

FIG. 1 B HIGH NECK

FIG. 1 TYPICAL V-NECK PULLOVER

Table 1 Dimensions of Pullover*(Clauses 5.1 and C-1.1)*

All dimensions in centimetres

SI No.	Size	Width Across Chest (A)	Length of Pullover (B)	Length of Sleeves (C) (see Notes)	Width of Opening at Armhole (D) (see Note 2)
(1)	(2)	(3)	(4)	(5)	(6)
i)	75	38.5	56.0	51.0	19.0
ii)	80	41.0	61.0	56.5	20.0
iii)	85	43.5	64.0	59.5	21.0
iv)	90	46.0	67.0	61.5	23.0
v)	95	48.5	70.0	61.5	24.0
vi)	100	51.0	73.0	64.5	25.0
vii)	105	52.5	75.0	65.0	26.0
viii)	110	55.0	77.0	66.0	26.0
Tolerance	—	± 1.5	−2.0	+ 2 −1	± 2
Method of Test		<i>see C-1</i>			

NOTES1 In case of pullover with 'Reglan' sleeves the dimensions shall be $(C + A/2)$.

2 The dimensions at C and D may be varied as agreed to between the buyer and the seller, subjected to the tolerances specified on the agreed values. However, the dimensions so agreed shall not be less than those specified above.

5.1.1 The other dimensions of the pullover as indicated in Fig. 1 shall be as agreed to between the buyer and the seller. For guidance, Annex B gives the minimum dimensions that go in making of a pullover. However, the minimum mass of the pullovers for each size may be as agreed to between the buyer and the seller.

NOTE — The size of the pullover is denoted by a number which is the approximate value of the chest girth in cm.

Example

An 80 size pullover represents a pullover with a chest girth of approximately 80 cm at A (*see* Fig 1).

5.2 The pullover shall conform to the requirements as specified in Table 2.

6 MARKING

6.1 A cloth label of suitable size shall be securely attached to each pullover on the inside of the neck

portion (back-side) or at the right side on the body of the seam in case of high neck pullover, on which shall be indicated the following:

- a) Name of manufacture or trade mark;
- b) Batch/lot no and date of manufacture;
- c) Size
- d) Class of pullover (*see* 4.1)
- e) Designation for woollen pullover only (*see* 4.1.1);
- f) Fibre/blend composition (*see* 4.1.1, 4.1.2 and 4.1.3);
- g) Care labelling (*see* IS 14452);
- h) Country of manufacture; and
- j) Any other information required by the buyer or law in force.

Table 2 Requirements of Pullover

(Clause 5.2 and 8.3)

SI No.	Characteristics	Requirements	Method of Test
(1)	(2)	(3)	(4)
i)	Construction		C-2
	a) Wales per 5 cm	As agreed between the buyer	
	b) Courses per 5 cm	and the seller with a tolerance of ± 2	
ii)	Dimensional change (due to relaxation) percent, <i>Max</i>	± 5	IS 1313
iii)	Scouring loss, percent, <i>Max</i>	5	C-3
iv)	Alkali, solubility, percent, <i>Max</i> (not applicable for 100 percent acrylic)		IS 3429
	a) Bleached	25	
	b) Dyed/mixed shade	20	
v)	pH value of aqueous extract		IS 1390
	a) All wool		
	i) Bleached and stoved shaded	4.0 to 7.5	
	ii) Other shades	6.0 to 7.5	
	b) Acrylic or blended	5.0 to 7.5	
vi)	Minimum colour fastness rating		
	a) Light	4	IS/ISO 105-B02
	b) Washing: Test A(1)		IS/ISO 105 C-10
	i) Change in colour	3	
	ii) Staining of adjacent fabric	3	
	c) Rubbing (Dry and wet)	3	IS/ISO 105 X-12
	d) Dry-cleaning	4	IS/ISO 105-D01
vii)	Fibre composition, percent	As agreed between the buyer and seller, with a tolerance of ± 2 units in case of blends, No tolerance for single fibre	IS 11195 or IS 667
viii)	Fineness grade of wool (woollen pullover)		IS 5911
	a) Superfine	Above 70 ^s	
	b) Fine	Above 60 ^s and up to 70 ^s	
	c) Medium	Above 56 ^s and up to 60 ^s	

6.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

7 PACKING

The pullovers shall be packed properly (*see* IS 3353 or IS 2518).

8 SEALED SAMPLE

8.1 If, in order to illustrate or specify the design, colour combination, type of finish, general appearance, feel, etc, of the pullover, a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.

8.2 The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

8.3 The quality characteristics namely number of wales and courses per 5 cm and the mass of ten pullover in kg, shall be in conformity with the sealed sample subjected to the tolerances as specified at SI No. 1 of Table 2 and ± 2.5 percent on mass.

9 SAMPLING

9.1 Lot

In any consignment, all the pullovers of the same size, and manufactured from the same quality of yarn shall constitute a lot.

9.1.1 Conformity of the lot to the requirements of this specification shall be determined on the basis of tests conducted on the samples selected from the lot.

9.2 Unless otherwise agreed upon between the buyer and the seller, a certain number of pullovers depending upon the lot shall be selected at random from the lot to constitute the gross sample, the number of such pullovers shall be in accordance with column 3 of Table 3.

9.3 For the purpose of examining the requirements in respect of:

- general requirements;
- the number of wales and courses per 5 cm; and
- dimensions of pullovers and such other requirements as might have been specified through sealed sample (**8.2** and **8.3**), the pullovers drawn in accordance with column 3 of Table 3 shall constitute the gross sample.

9.3.1 If agreed by the buyer, for the determination of mass, a group of 10 pullovers in the gross sample shall constitute a test specimen and for the purpose of remaining requirements enumerated in **9.3**, each pullover in the gross sample shall constitute a test specimen.

9.4 For determining:

- dimensional change,
- pH value,
- scouring loss,
- colour fastness,
- alkali solubility,

Table 3 Sample Size and Criteria for Conformity
(Clauses 9.2, 9.3, 9.4 and 9.5)

SI No.	No. of Pullover	Sample Size		Sub – Sample Size
		No. of Pullover to be Selected	Permissible no. of Non-confirming Pullover	
(1)	(2)	(3)	(4)	(5)
i)	Up to 50	10	0	3
ii)	51-100	20	1	3
iii)	101-200	30	2	3
iv)	201-300	40	3	3
v)	301-500	50	3	4
vi)	501-800	70	4	4
vii)	801-1300	110	6	5
viii)	1301-3200	150	8	7
ix)	3201 and above	220	11	7

- f) fibre composition, and
- g) fineness grade of wool, the reduced sample drawn in accordance with column 5 of Table 3, obtained by selecting pullovers at random from those in the gross sample shall constitute the test sample.

9.5 Criteria and Conformity

A lot shall be considered as conforming to this standard, if:

- a) in respect of:
 - 1) general requirements,
 - 2) the number of wales and courses per 5 cm,
 - 3) dimensions of pullovers and such other requirements as might have been specified through sealed sample (8.2 and 8.3), the number of pullovers failing to satisfy any one of these requirements does not exceed the applicable number specified in column 4 of Table 3.

- b) In respect of mass, if specified and agreed by the buyer, each of the observed values satisfies the agreed values.
- c) From the observed values of dimensional change, scouring loss, alkali solubility the average X and the range R are calculated and the value of the expression $X + 0.5 R$ is found to be less than or equal to the specified value.
- d) From the observed pH value, the average X and the range R are calculated, and the values of the expression $X - 0.5 R$ and $X + 0.5 R$ lies within the specified value.

NOTES

1 The average X is obtained by dividing the sum of all the observed values by the number of samples tested.

2 The range R is the difference between the maximum and the minimum of the observed values.

- e) None of the test specimens tested for colour fastness, fibre composition and fineness grade of wool fails to satisfy the requirements.

ANNEX A

(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No. /Other Publication</i>	<i>Title</i>	<i>IS No. /Other Publication</i>	<i>Title</i>
SP 45 : 1988	Handbook on glossary of textile terms	9543 : 2015	Textiles — Spun polyester sewing threads — Specification (<i>first revision</i>)
667 : 1981	Methods for identification of textile fibres (<i>first revision</i>)	10789 : 2000/ ISO 4915 : 1991	Textiles — Stitch type — Classification and terminology (<i>first revision</i>)
1313 : 1984	Methods for determination of dimensional changes on washing of knitted goods containing wool (<i>first revision</i>)	11161 : 2000/ ISO 4916 : 1991	Textiles — Seam types — Classification and terminology (<i>first revision</i>)
1390 : 2019/ ISO 3071 : 2005	Textiles — Determination of pH of aqueous extract (<i>second revision</i>)	11195 : 1985	Specification for blend compositions of textiles
1720 : 1978	Specification for cotton sewing threads (<i>first revision</i>)	14452 : 2014/ ISO 3758 : 2012	Textiles — Care labelling code using symbols (<i>second revision</i>)
2518 : 1964	Code for worthy packaging of wool hosiery yarn and goods	IS/ISO 105-B02 : 2014	Textiles — Tests for colour fastness: Part B02 Colour fastness to artificial light : Xenon arc fading lamp test
3353 : 1966	Code for inland packing of wool hosiery yarn and goods	IS/ISO 105-C10 : 2006	Textiles — Tests for colour fastness: Part C10 Colour fastness to washing with soap or soap and soda
3429 : 1966	Method for determination of solubility of wool in alkali	IS/ISO 105-D01 : 2010	Textiles — Tests for colour fastness: Part D01 Colour fastness to drycleaning using perchloroethylene solvent
3596 : 1967	Glossary of term relating to hosiery	IS/ISO 105-E 04 : 2008	Textiles — Tests for colour fastness: Part E04 Colour fastness to perspiration
5911 : 1977	Fineness grades of wool tops (<i>first revision</i>)	IS/ISO 105-X12 : 2016	Textiles — Tests for colour fastness: Part X12 Colour fastness to rubbing (<i>first revision</i>)
7026 : 1973	Specification for hosiery yarn, worsted		
7747 : 1993	Textiles — Hand - knitting wool yarn, worsted — Specification (<i>first revision</i>)		

ANNEX B

(Clause 5.1.1)

Table 4 Recommended Minimum Dimensions at Other Places of Pullover

Sl No.	Size (cm)	Dimensions in cm							
		Border		Cuff		Sleeve Width G	Neck Opening, J		
		Depth E	Width E1	Depth F	Width F ₁		Width H	Depth	
								V-neck J ₁	R-neck J ₂
i)	75	7.0	33.0	7.0	8.0	10.0	12.0	16.0	7.5
ii)	80	7.5	35.5	7.5	9.0	11.0	13.0	18.0	8.0
iii)	85	8.0	38.0	8.0	9.0	11.0	14.0	19.0	8.0
iv)	90	8.5	40.5	8.5	10.0	12.0	15.0	20.0	8.0
v)	95	9.0	43.0	9.0	10.0	12.0	16.0	21.0	9.0
vi)	100	9.0	45.5	9.0	10.0	13.0	17.0	23.0	9.0
vii)	105	9.0	48.0	9.0	11.0	13.0	18.0	24.0	9.0
viii)	110	9.5	50.0	9.5	12.0	14.0	19.0	25.0	10.0

ANNEX C

[(Clauses 5.1 and 5.2, Table 1 and Table 2)]

C-1 METHOD FOR MEASURING DIMENSIONS**C-1.1 Procedure**

Take a pullover constituting the test specimens. Lay it flat on a horizontal surface. Remove all creases and wrinkles without distorting the specimen. Measure correct to the nearest 5 mm, the dimensions given in Table 1.

C-1.2 Take the pullover to be in conformity with the requirements of Table 2 in respect of dimensions. If none of the values as observed in **C-1.1** varies from the specified value than the specified tolerance.

C-1.3 Repeat the procedure with the remaining pullovers in the test specimens.

C-2 WALES AND COURSES**C-2.1 Procedure**

Take a pullover constituting the test specimens. Lay it flat on a horizontal surface. Remove all creases and wrinkles without distorting it. On one side of test specimen, count with the help of a pick glass or magnifying glass, the number of wales per 5 cm and courses per 5 cm of the fabric.

C-2.2 Take the pullover conforming to the requirements of Table 3 in respect of wales and course, if the values for the number of wales per 5 cm and the courses per 5 cm as determined in **C-2.1** do not vary from the specified value by more than the specified tolerances.

C-2.3 Repeat the procedure with the remaining pullovers in the test specimens.

C-3 METHOD FOR DETERMINING SCOURING LOSS**C-3.1 Test Specimen**

Take about 10 g of yarn from each sample. This shall constitute a test specimen.

C-3.2 Procedure

Dry the test specimen to constant mass in the drying oven at 105 ± 3 °C temperature and determine its mass accurately.

NOTE — Constant mass shall be deemed to have been reached if the difference between the two successive weighings at an interval of 20 min is less than 0.05 percent.

C-3.3 Extract the specimen with a mixture of benzene and methyl alcohol in the proportion of 3 : 2 in a Soxhlet apparatus for 4 h at the rate of 5 extractions per hour, taking care to place the specimen in a thimble

and covering it with cotton wool previously extracted with petroleum hydrocarbon solvent (petroleum ether). Remove the specimen from the extract. Dry the residue to a constant mass (*see* Note under **C-3.2**) at 105 ± 3 °C and determine the mass accurately.

C-3.4 Calculation

Calculate the scouring loss by the following formula:

$$\text{Scouring loss, percent} = \frac{a \times 100}{b}$$

where

a) = mass of the dry residue (*see* **C-3.3**), and

b) = mass of test specimen (*see* **C-3.1**).

ANNEX D*(Foreword)***COMMITTEE COMPOSITION**

Hosiery Sectional Committee, TXD 10

<i>Organization</i>	<i>Representative(s)</i>
The South India Textile Research Association, Coimbatore	DR PRAKASH VASUDEVAN (Chairman) SHRI S. SOUNDERRAJ (<i>Alternate</i>)
Apparel Export Promotion Council, Tirupur	DR K. RAJENDRAKUMAR
Central Armed Police Forces (CAPF), New Delhi	SHRI D.N. LAL SHRI RANDHIR KR JHA (<i>Alternate</i>)
DKTE Society's Textile and Engg. Institute, Ichalkaranji	DR UJAY J PATIL SHRI ANIL U. AWASARE (<i>Alternate</i>)
Essa Garments, Tirupur	SHRI DURGADEVI
JKR Garments, Tirupur	SHRI JAILANI
Knitwear and Apparel Manufacturers Association, Ludhiana	SHRI SUDARSHAN KUMAR JAIN SHRI ARUN AGGARWAL (<i>Alternate</i>)
Ministry of Defence (DGQA), New Delhi	SHRI ARVIND KAMTHANE SHRI J. K. YADAV (<i>Alternate</i>)
Ministry of Defence (DMSRDE), Kanpur	SHRI ASHOK YADAV SHRI MILANT PANT (<i>Alternate</i>)
National Institute of Fashion Technology, New Delhi	SHRI ASHOK PRASAD MS AMRITA ROY (<i>Alternate</i>)
NIFT-TEA College of Knitwear Fashion, Tirupur	DR K. P. BALAKRISHNAN DR P. P. GOPALAKRISHNAN (<i>Alternate</i>)
Office of the development Commissioner, Small Scale Industries, (MSME) New Delhi	SHRI KULDEEP SINGH SHRI S. SURESH BABUJI (<i>Alternate</i>)
Office of Textile The Commissioner, Mumbai	SHRI HUMAYUN K. SHRI SATISH KUMAR N. (<i>Alternate</i>)
Southern India Mills' Association, Coimbatore	DR K. SELVARAJU SHRI D. SURESH ANAND KUMAR (<i>Alternate</i>)
SGS, Chennai	DR KARTHIKEYAN K. SHRI MICHAEL FRANCIS (<i>Alternate</i>)
Textiles Committee, Tirupur	SHRI R. CHANDRAN SHRI J. PARAMESWARAN (<i>Alternate</i>)
The South India Hosiery Manufacturers' Association, Tirupur	SHRI M. TYAGRAJAN SHRI R. BALASARAVANAN (<i>Alternate</i>)
The Synthetic & Rayon Textiles Export Promotion Council, New Delhi	SHRI ANIL RAJVANSHI SHRI BHADRESH M DHODIA (<i>Alternate</i>)
Tirupur Exporters Association, Tirupur	SHRI T. R. VIJAYKUMAR SHRI S. SHAKTIVEL (<i>Alternate</i>)
Veermata Jijabai Technological Institute, Mumbai	DR SHASHIKANT BORKAR DR ARVIND BHONGADE (<i>Alternate</i>)

<i>Organization</i>	<i>Representative(s)</i>
Wool Research Association, Thane	DR MRINAL CHOUDHARI SHRI MAYUR BASUK (<i>Alternate</i>)
BIS Directorate General	SHRI A. K. BERA, SCIENTIST 'F' AND HEAD (TEXTILES) [REPRESENTING DIRECTOR GENERAL (<i>Ex-officio</i>)]
<i>Member Secretary</i>	
SHRI DHARMBEER SCIENTIST 'C' (TEXTILES), BIS	

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 2016* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc No.: TXD 10 (16846).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402

Website: www.bis.gov.in

Regional Offices:

Telephones

Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 2323 7617 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	{ 2337 8499, 2337 8561 2337 8626, 2337 9120
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg CHANDIGARH 160019	{ 265 0206 265 0290
Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600113	{ 2254 1216, 2254 1442 2254 2519, 2254 2315
Western	: Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400093	{ 2832 9295, 2832 7858 2832 7891, 2832 7892

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. COIMBATORE.
DEHRADUN. DURGAPUR. FARIDABAD. GHAZIABAD. GUWAHATI.
HYDERABAD. JAIPUR. JAMMU. JAMSHEDPUR. KOCHI. LUCKNOW.
NAGPUR. PARWANOO. PATNA. PUNE. RAIPUR. RAJKOT. VISAKHAPATNAM.

Published by BIS, New Delhi